Targeting Barrier Removal to Benefit Migratory Fish Species in the Great Lakes

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The Mission of the Nature Conservancy

To conserve the lands and waters on which all life depends.

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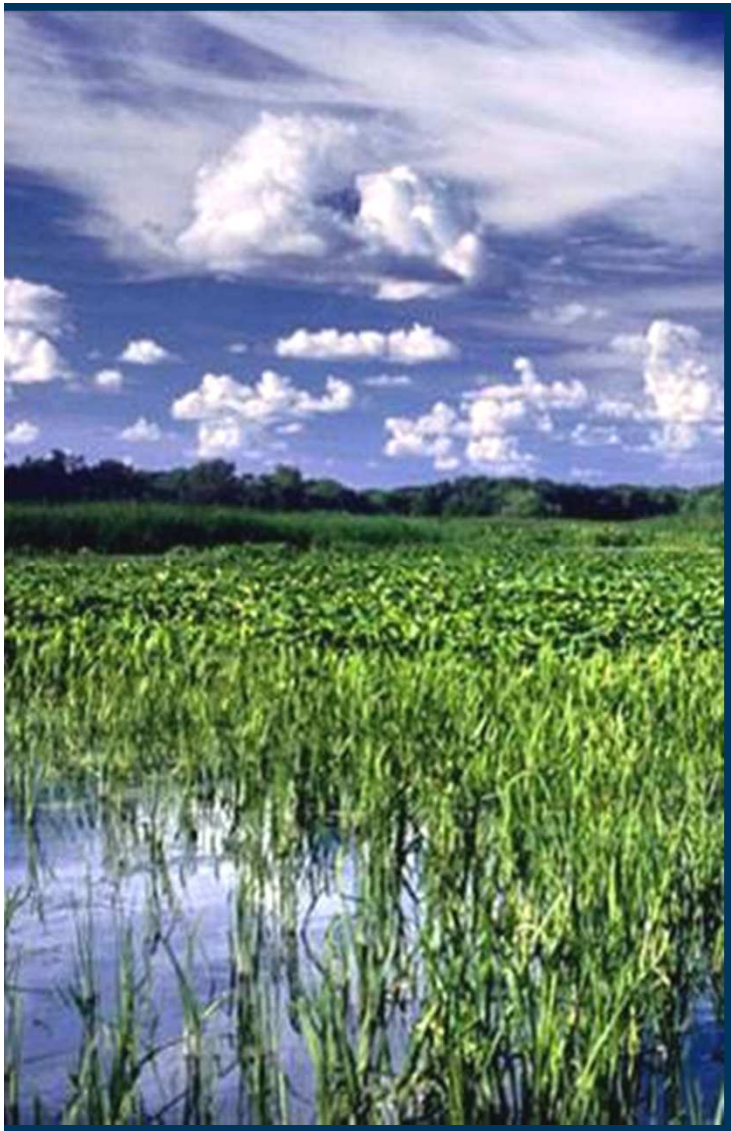
The Nature Conservancy *facts*



- Formed in 1951, committee of ESA
- Science-based approach, more than 700 staff scientists
- 119 million acres protected globally; protected thousands of miles of rivers and operate more than 100 marine conservation projects
- Over 1 million members
- Work in all 50 states and over 30 countries

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Great Lakes Project

Aquatic Connectivity

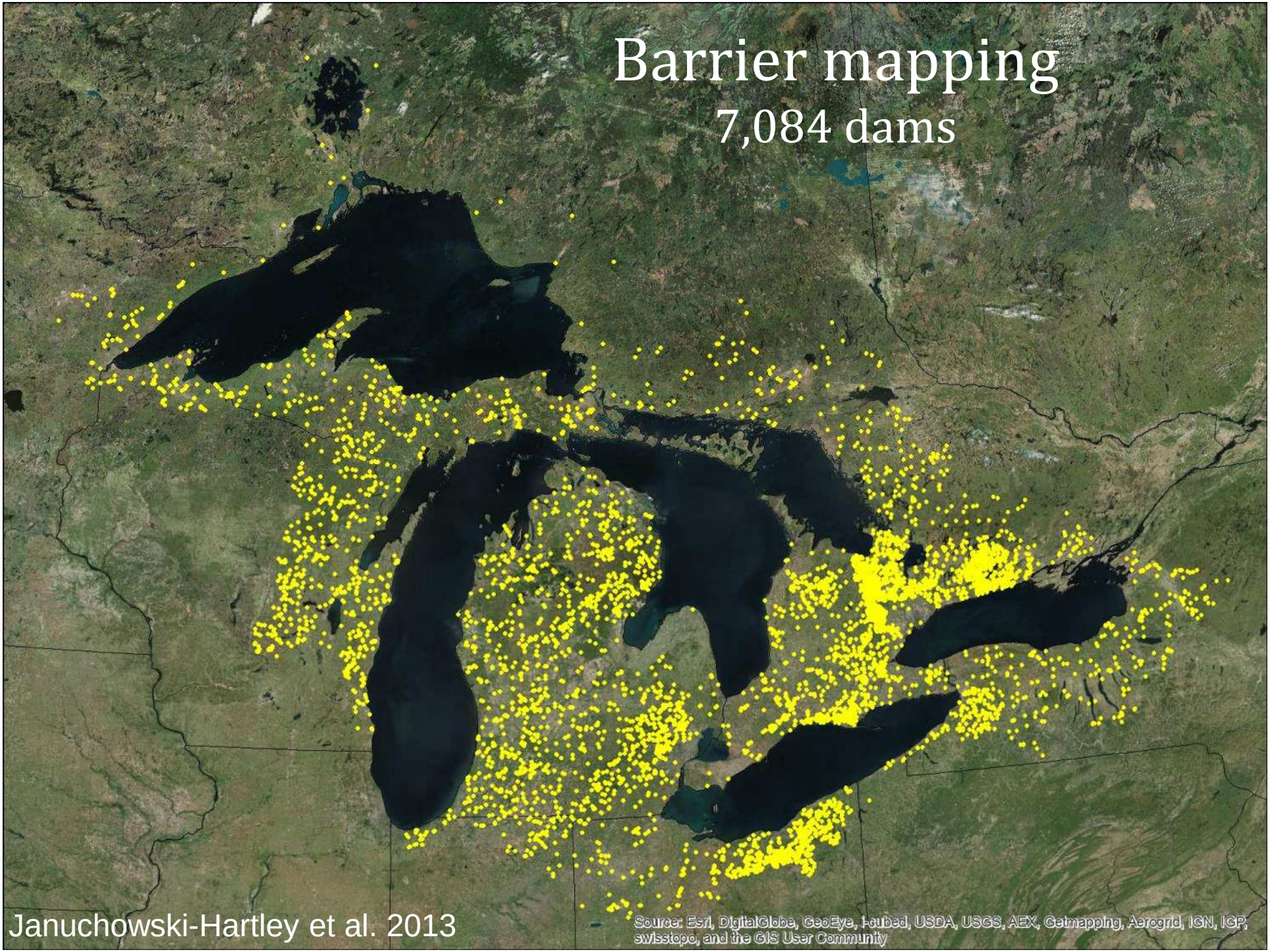
Aquatic Invasive Species

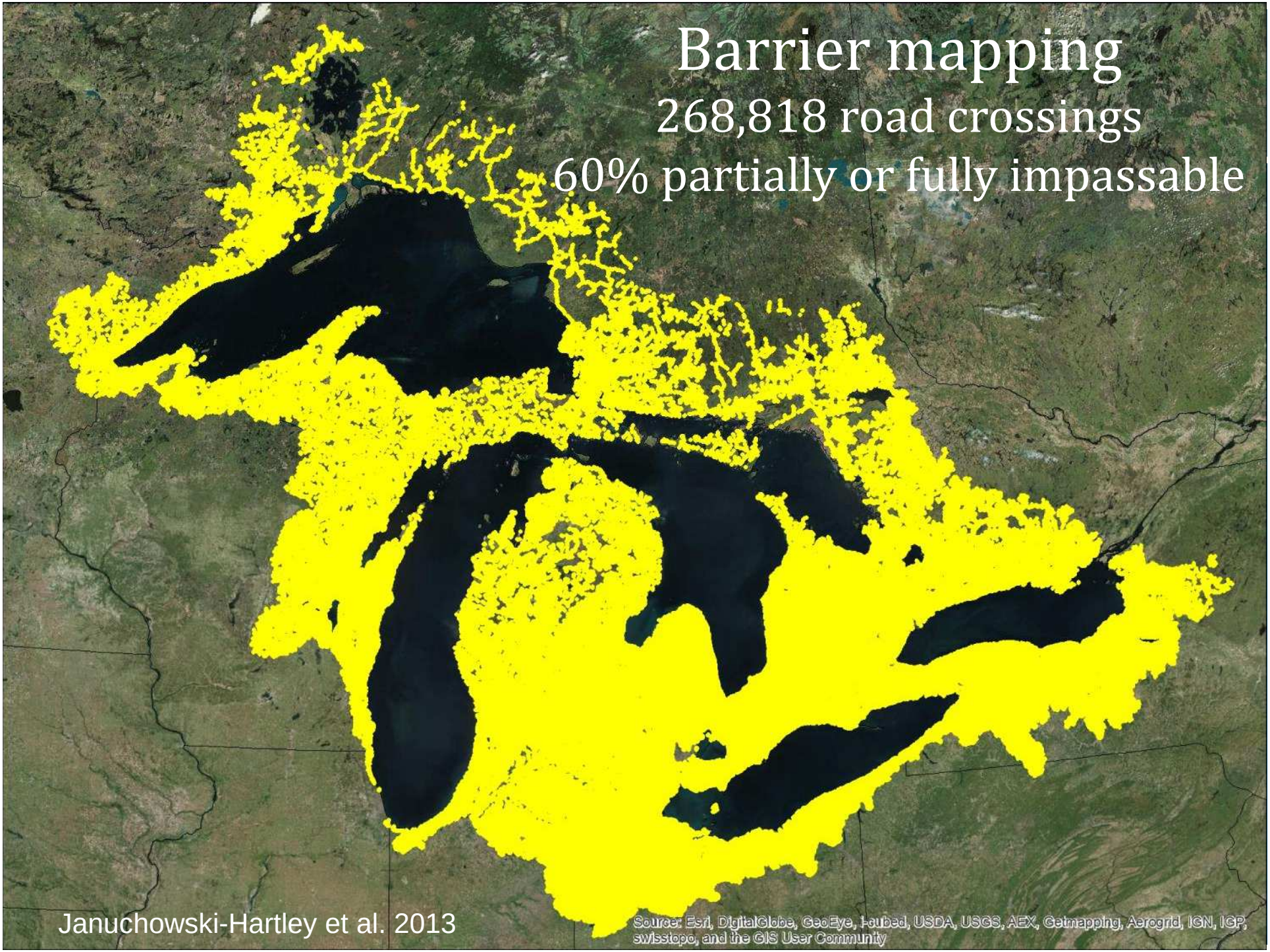
Agriculture and Altered Hydrology

Native Fish Restoration

Coastal Conservation

Northern Forests


Barrier mapping
7,084 dams
Januchowski-Hartley et al. 2013
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


Barrier mapping
268,818 road crossings
60% partially or fully impassable
Januchowski-Hartley et al. 2013
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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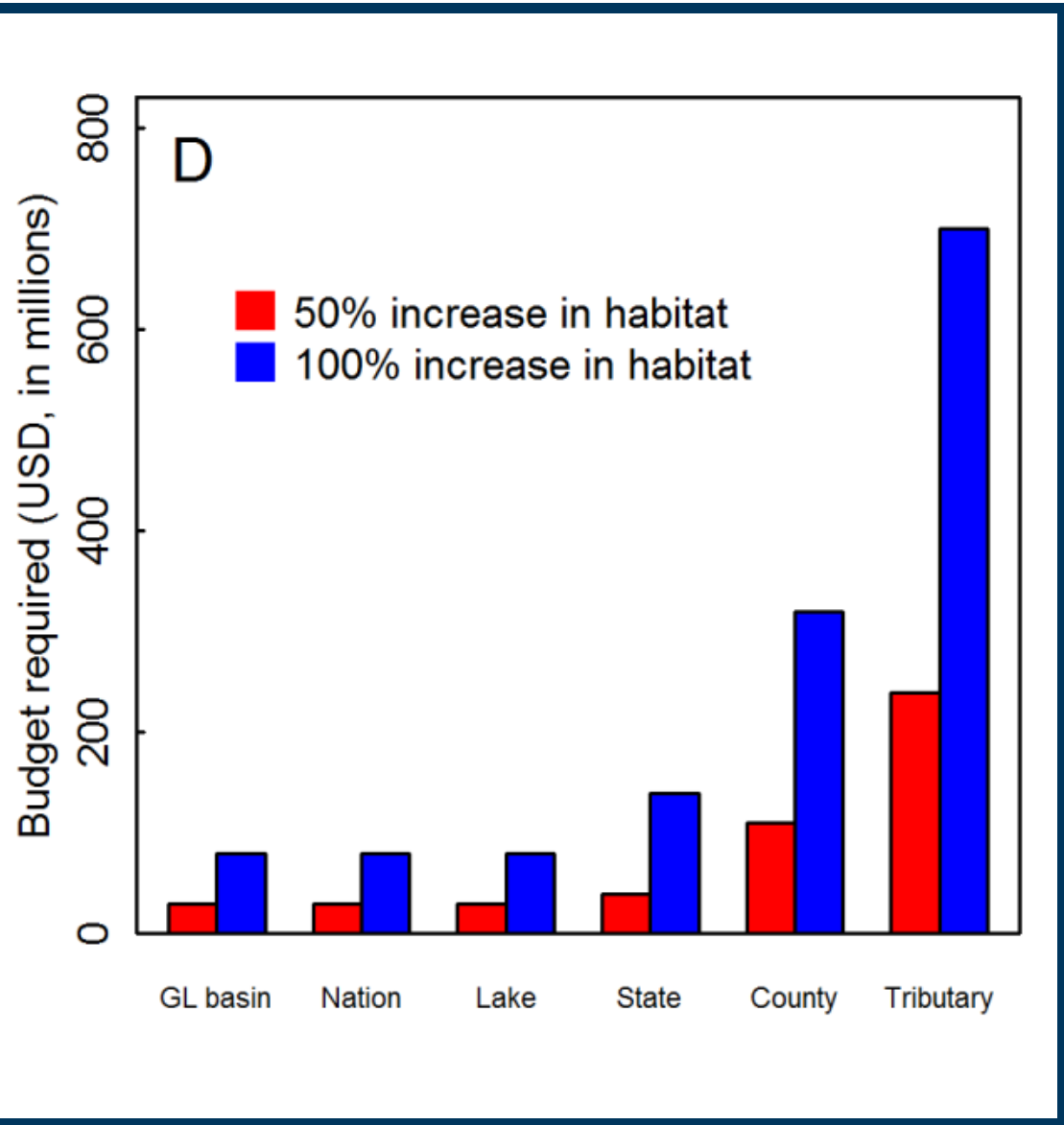
Balancing key factors

Optimization results



Spatial scale matters: greater cost to prioritize within smaller areas

Neeson et al. 2015

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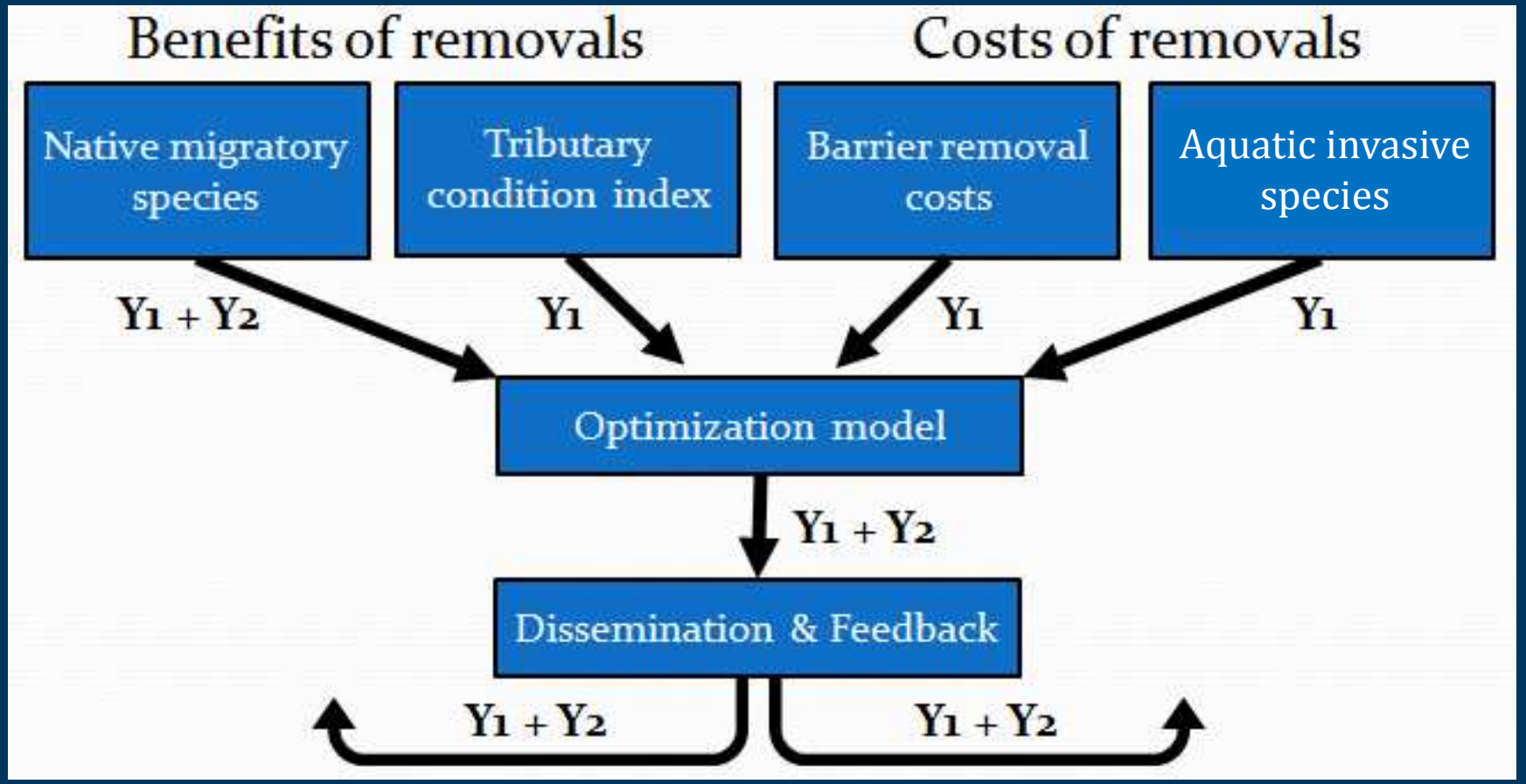
Moving Forward

Barrier decision support tool (McIntyre et al.):



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Great Lake Migratory Fishes

Species that have populations that depend on both the Great Lakes and tributary habitat for part of their life cycle, which includes but is not limited to species that are known to have distinct seasonal spawning runs.

Objectives

- Map and prioritize tributaries for each migratory fish species
  - Identify priorities separately for connected and unconnected (above barriers) tributary sections
- Identify priority tributaries across all native migratory fish species
- Work with McIntyre optimization team to provide data for migratory fish benefits
- Use these results to help set goals for migratory fish restoration

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Data sources

Location	Source	Stream Data	Coastal Data	Presence	Abundance	Age Class
Ontario	MNR - ARA	X	X	X		
	MNR - FWIS	X		X	X	
	11 Conservation Authorities	X	3	X	6	2
	DFO	X	X	X	X	
	ROM	X		X		
Illinois	DNR	X	X	X	X	
Indiana	DNR	X		X	X	
	DEM	X		X		
Michigan	DEQ	X		X		
	DNR		X	X	X	X
	Fish Atlas	X	X	X		
	DNR - MRI - LP	X		X	X	
	DNR - MRI - UP	X		X	X	
Minnesota	DNR – FishMap*	X	X	X	X	
New York	DEC	X	X	X		
Ohio	Ohio EPA	X		X	X	
	OSU	X	X	X	X	
Pennsylvania	Fish & Boat Commission**	X	X	X	X	
Wisconsin	DNR	X	X	X	X	X
	FishMap	X	X	X	X	
US - Great Lakes	USFWS Lamprey survey	X		X		
Great Lakes	Goodyear Atlas		X	X		

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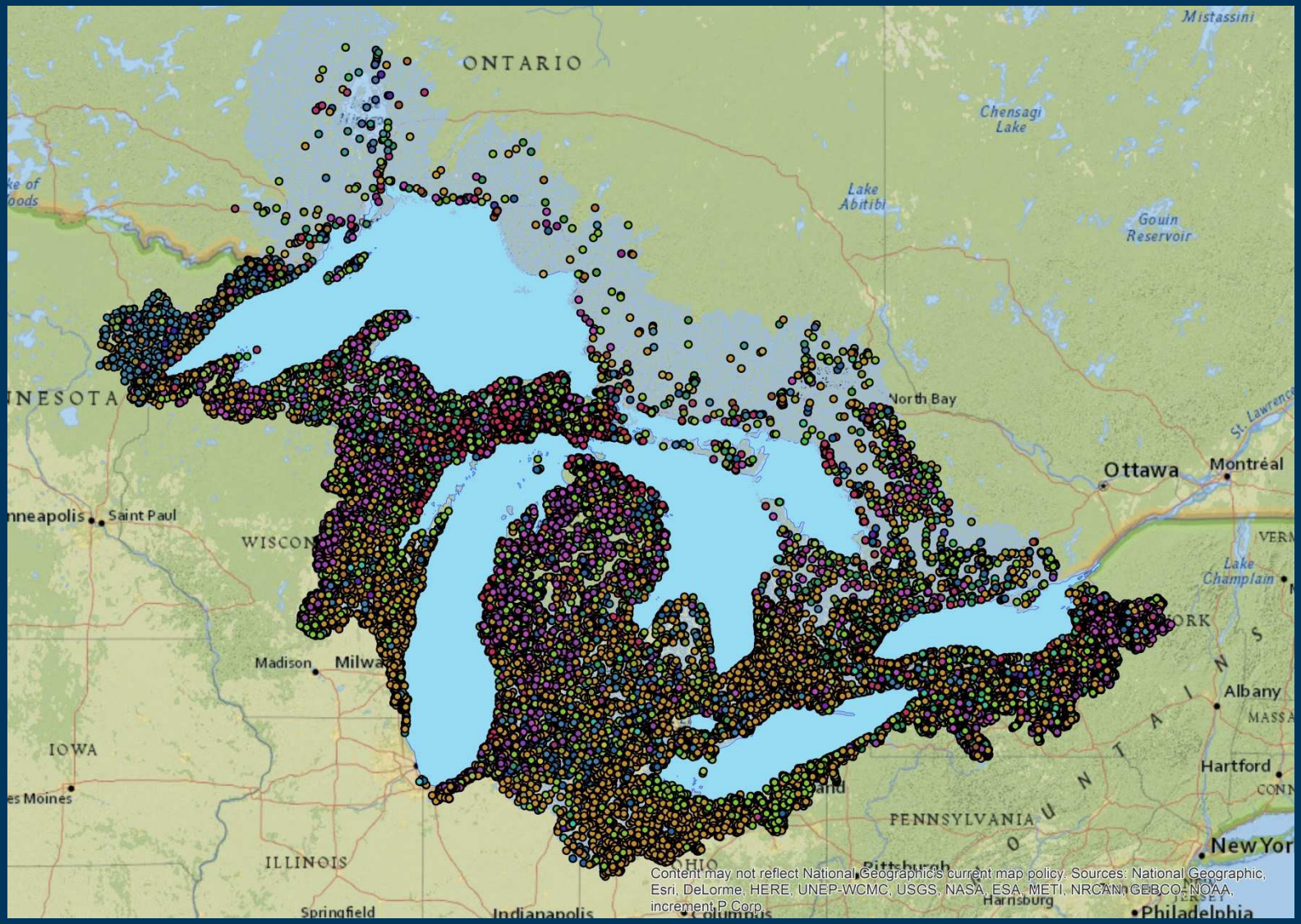
All 45 Migratory Species



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White sucker (*Catostomus commersonii*)

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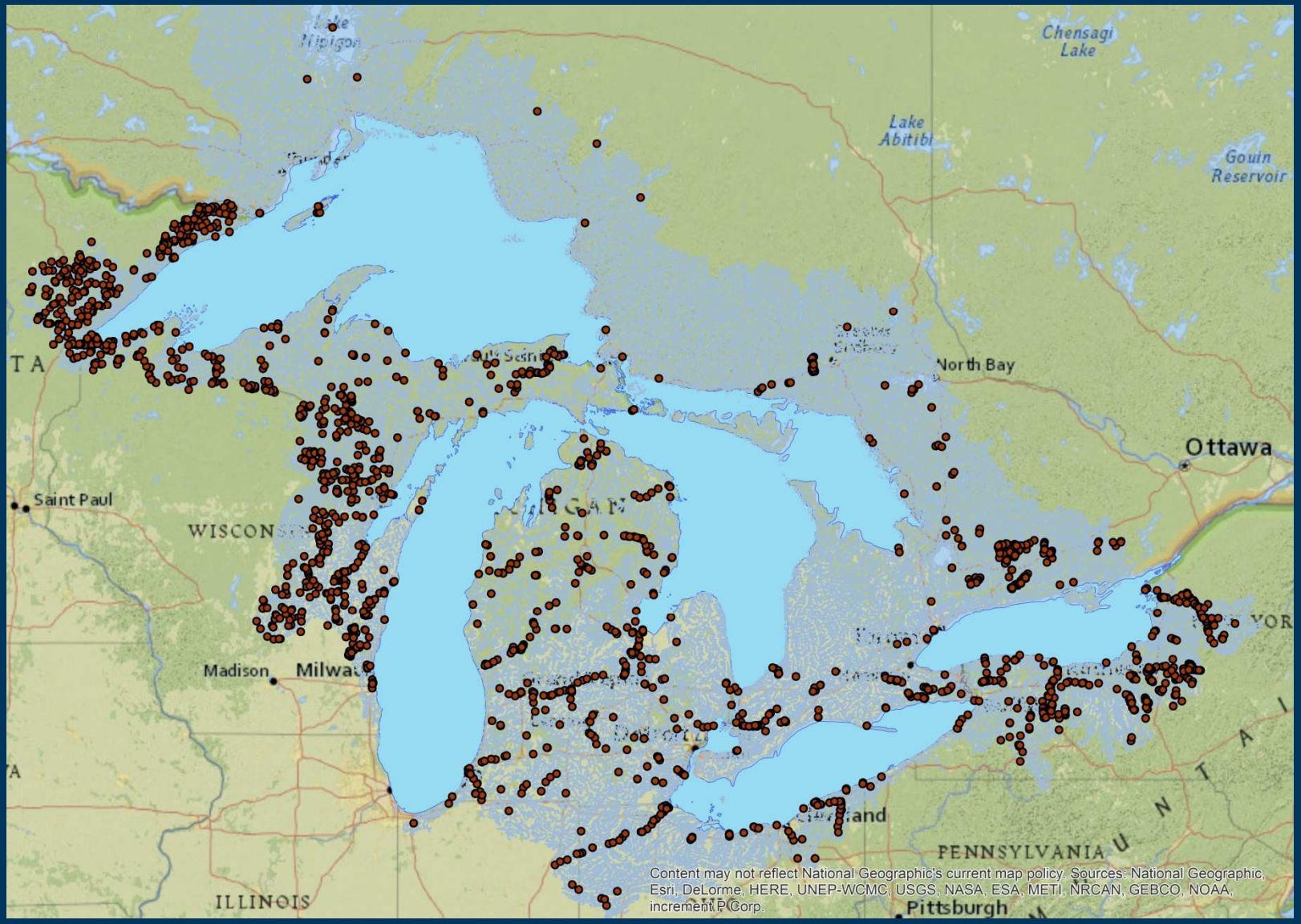
Walleye (*Sander vitreus*)



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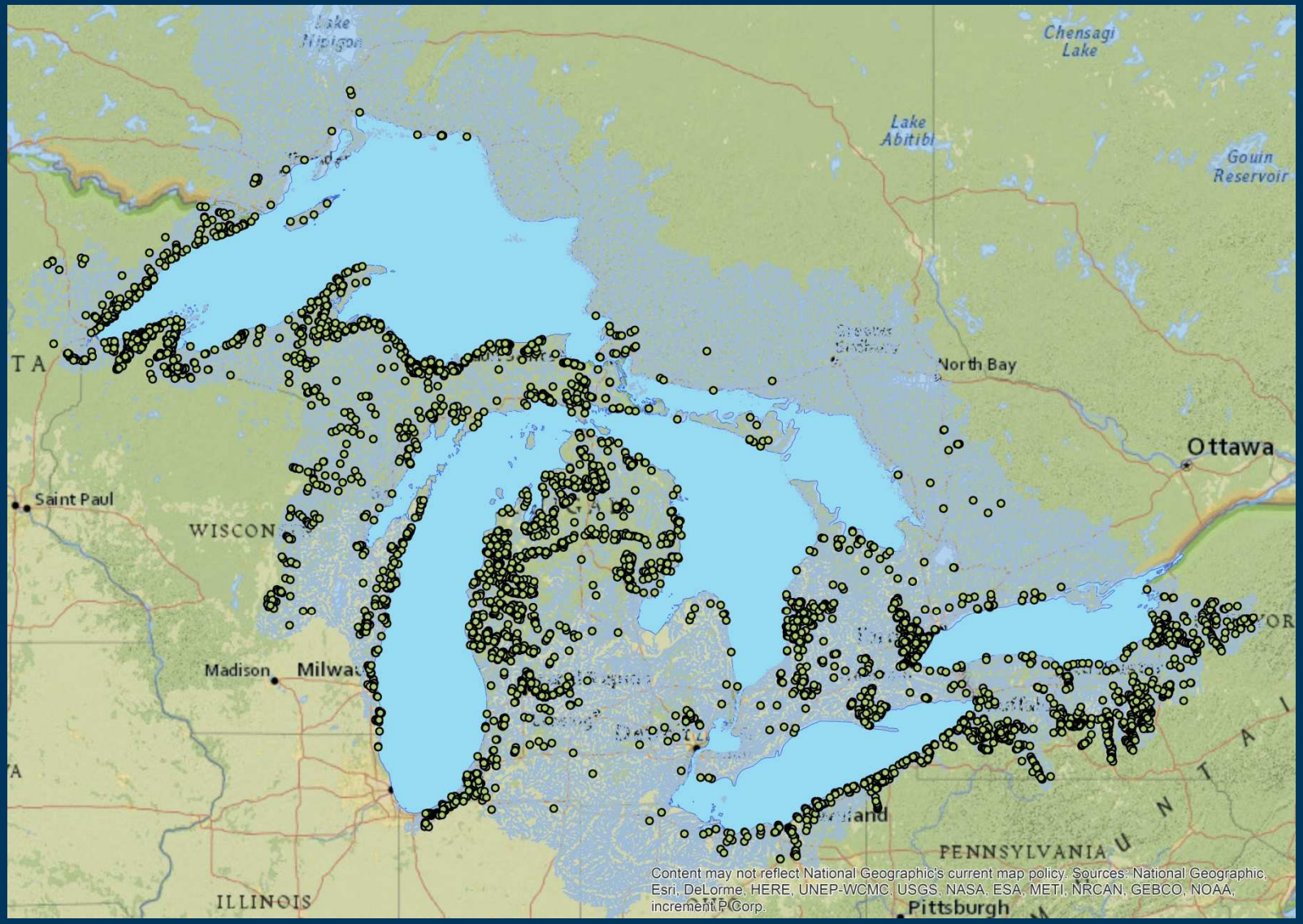
Rainbow trout (*Oncorhynchus mykiss*)



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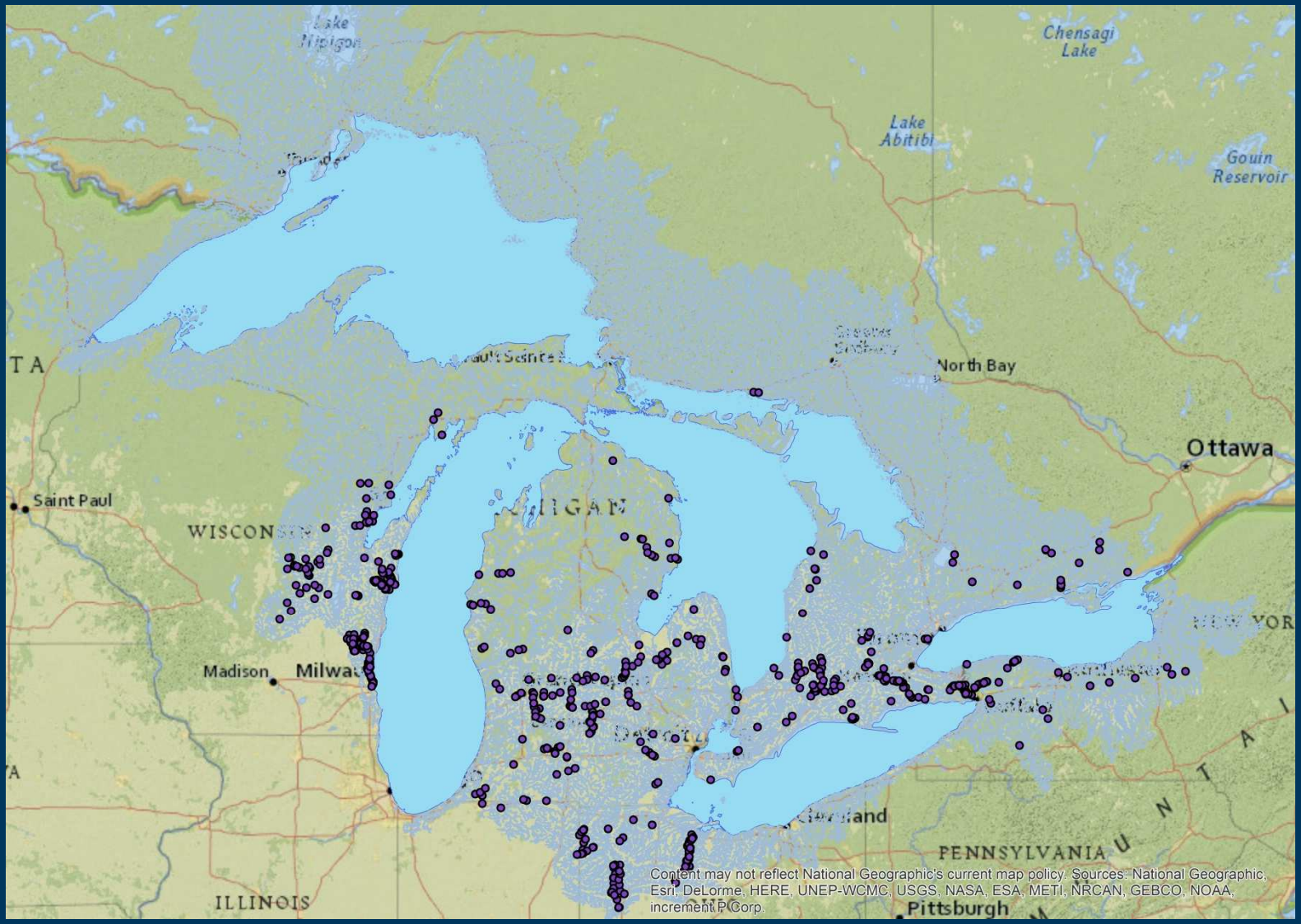
Greater redhorse (*Moxostoma valenciennes*)



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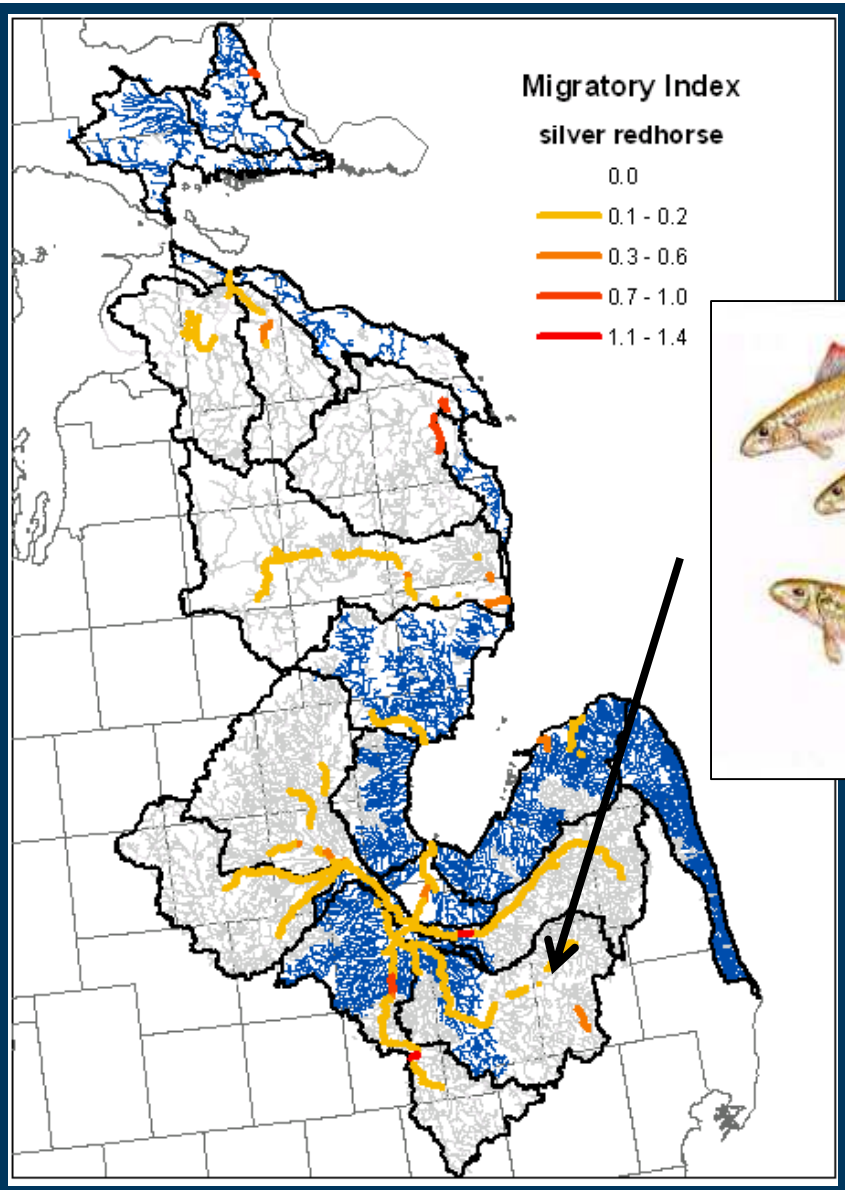
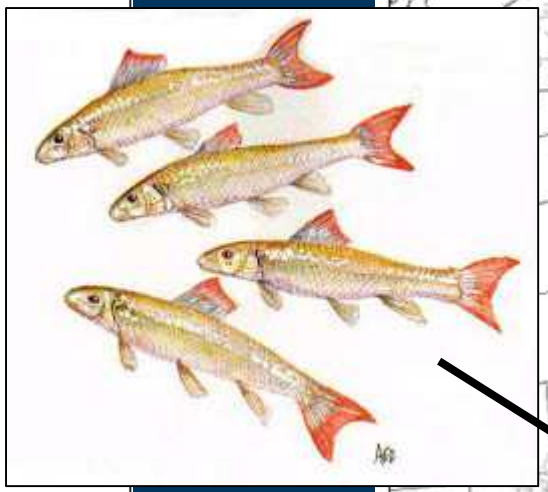
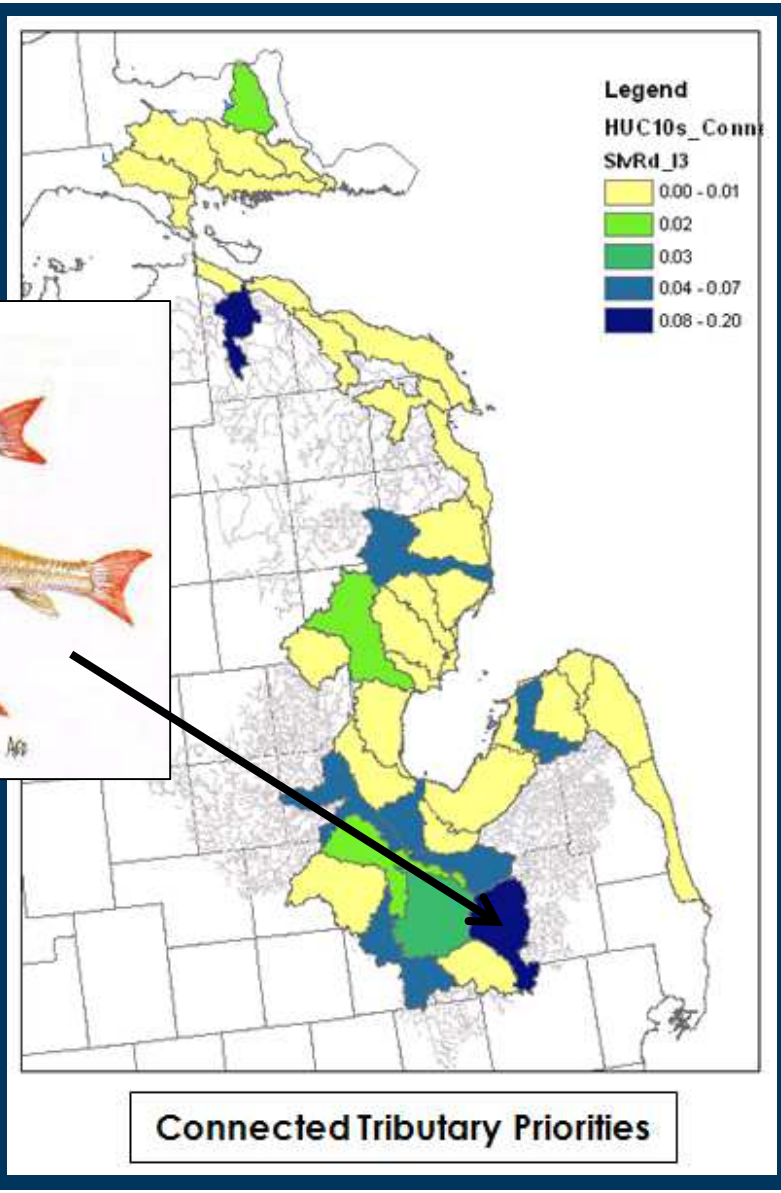
Analysis







Connected Tributary Priorities

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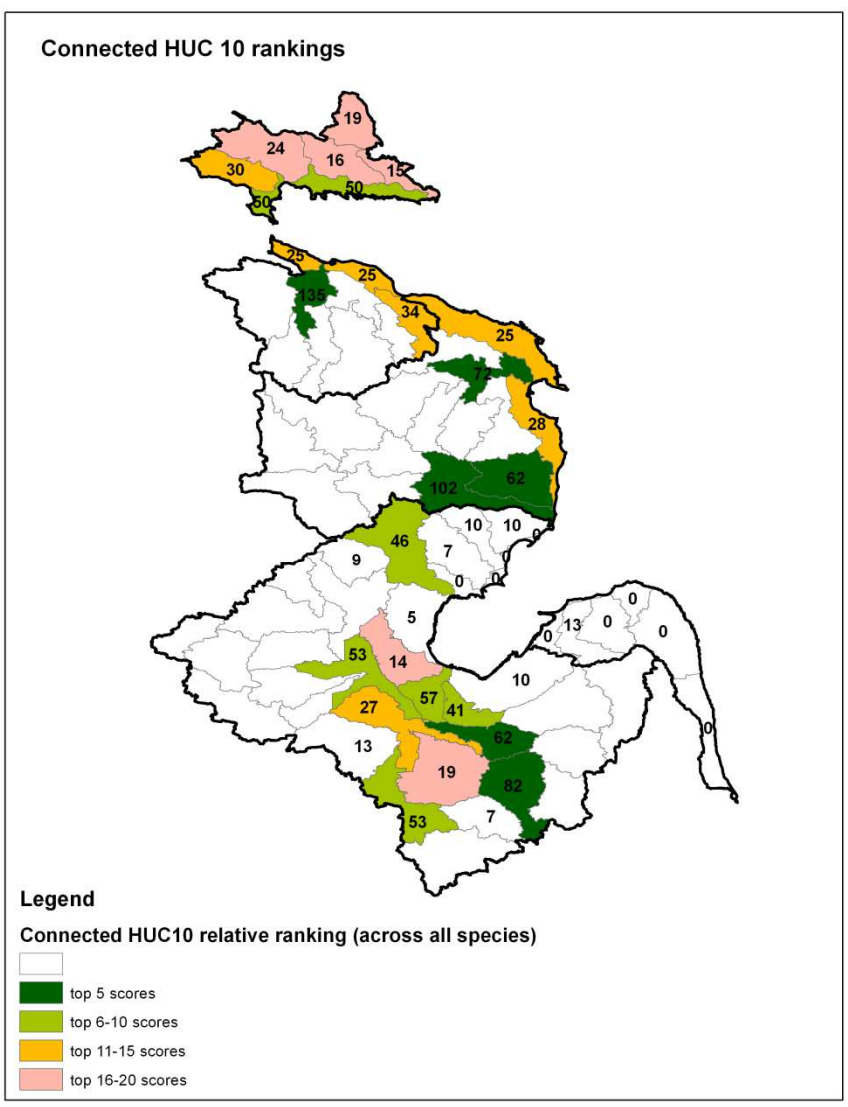
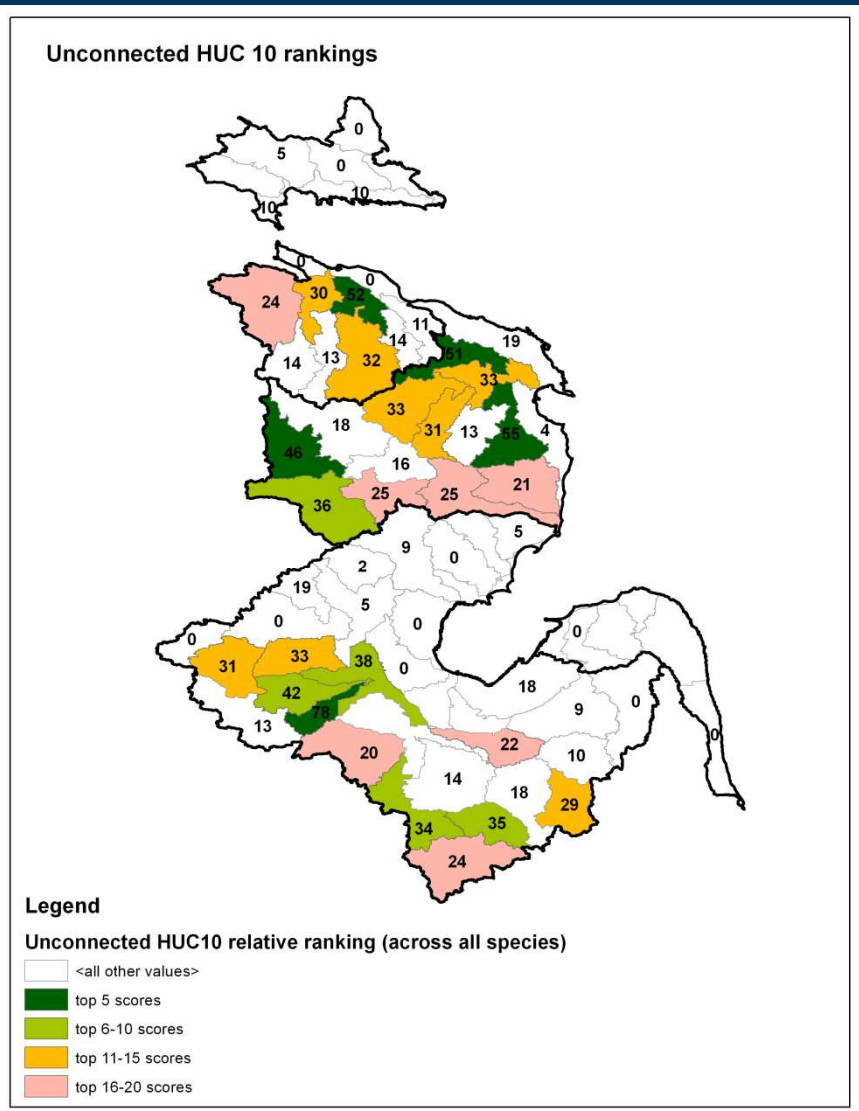
Top Ranked HUC10 Watersheds





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How to follow research developments

- Great Lakes Inform (www.greatlakesinform.org)
- Center for Limnology, UW-Madison (limnology.wisc.edu)
- Great Lakes Aquatic Habitat Connectivity Collaborative (lwalter@glfc.org, joseph_sheahan@fws.us)

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Questions?

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